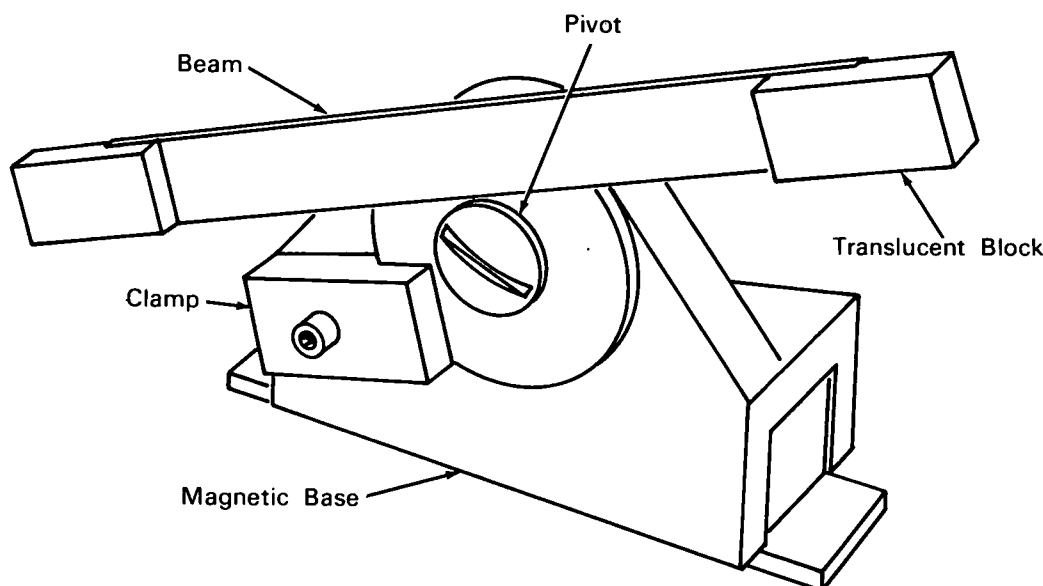


# NASA TECH BRIEF



This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the NASA space program.

## Setting of Angles on Machine Tools Speeded by Magnetic Protractor



**The problem:** Rapid, accurate setting or checking of angles on machine tools. Conventional methods using comparators, sine bars, gage blocks, and master flats are time-consuming and present difficulties when the machine tools are in remote areas or of complicated configuration.

**The solution:** An adjustable protractor with a magnetic base to facilitate attaching the device to a reference surface on the machine. The protractor incorporates a beam, approximately 6 inches in length, mounted on a pivot about which the beam can be rotated to any required angle with respect to the magnetic base.

**How it's done:** The angle to be transferred is first established via some conventional method; at Ames Research Center a contour projector is used, but less

expensive methods will suffice. The beam on the magnetic protractor is adjusted until its shadow coincides with the image on the screen of the projector. Translucent blocks on the ends of the beam may be tapped by the operator to facilitate fine adjustments of the beam setting. The beam is then clamped in position, and the setting is rechecked. The angle is then transferred to the machine tool.

Angles are easily transferred to remote machine tools or surfaces on which a sine bar and gage blocks cannot be conveniently used, and the setup is accomplished in a fraction of the time required with conventional methods.

### Notes:

1. The magnetic protractor can transfer angles to an accuracy of 1 minute of arc.

(continued overleaf)

2. A very simple modification to this protractor configuration used at Ames—calibrating the distance between the center of rotation and one end of the beam—would be needed to allow the protractor to be set to the desired angle with gage blocks and permit its use in shops which do not have a contour projector or comparator.

3. For further information about this innovation inquiries may be directed to:

Technology Utilization Officer

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Reference: B63-10006

**Patent status:** NASA encourages commercial use of this innovation. No patent action is contemplated.

Source: Lester B. Vale

(ARC-5)